

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
9 August 2001 (09.08.2001)

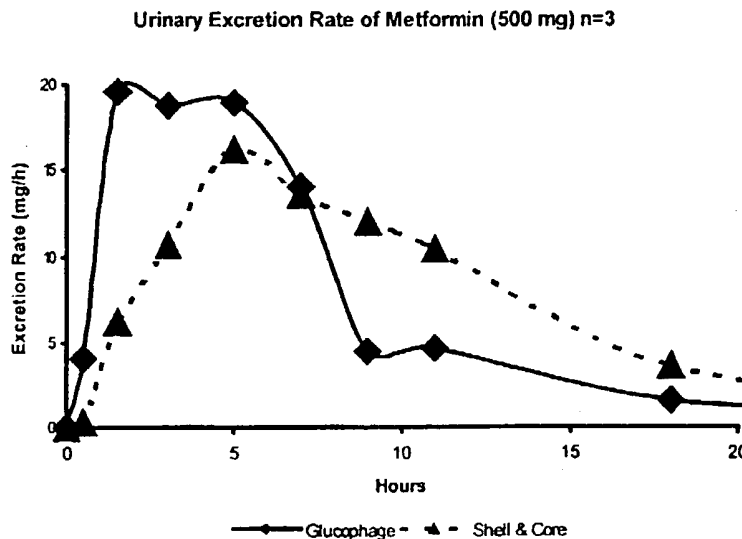
PCT

(10) International Publication Number  
WO 01/56544 A3

- (51) International Patent Classification<sup>7</sup>: A61K 9/20, 9/28 (74) Agents: HEINES, M., Henry et al.: Townsend and Townsend and Crew LLP, Two Embarcadero Center, Eighth Floor, San Francisco, CA 94111 (US).
- (21) International Application Number: PCT/US01/03027
- (22) International Filing Date: 30 January 2001 (30.01.2001) (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
09/498,945 4 February 2000 (04.02.2000) US (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant: DEPOMED, INC. [US/US]; 366 Lakeside Drive, Foster City, CA 94404-1146 (US).
- (72) Inventors: BERNER, Bret; 239 El Granada Boulevard, El Granada, CA 94018 (US). LOUIE-HELM, Jenny; 30580 Mallorca Way, Union City, CA 94587 (US). GUSLER, Gloria; 20671 McClellan Road, Cupertino, CA 95014 (US). SHELL, John, N.; 3209 Outlook Drive, Rocklin, CA 95765 (US).
- Published:  
— with international search report
- (88) Date of publication of the international search report:  
2 May 2002

[Continued on next page]

(54) Title: SHELL-AND-CORE DOSAGE FORM APPROACHING ZERO-ORDER DRUG RELEASE



(57) Abstract: Drugs are formulated as oral dosage forms for controlled release in which the release rate limiting portion is a shell surrounding the drug-containing core. The shell releases drug from the core by permitting diffusion of the drug from the core. The shell also promotes gastric retention of the dosage form by swelling upon imbibition of gastric fluid to a size that is retained in the stomach during the postprandial or fed mode.

WO 01/56544 A3



---

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/03027

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K9/20 A61K9/28

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS, CHEM ABS Data, MEDLINE, EMBASE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 55107 A (DEPOMED INC ;SHELL JOHN W (US); LOUIE HELM JENNY (US)) 10 December 1998 (1998-12-10) page 2, line 23 -page 3, line 19 page 3, line 32 - line 33; figure 5 page 4, line 30 -page 6, line 18; claims; examples 1,5	1-15, 22-30
X	DE 44 32 757 A (BOEHRINGER MANNHEIM GMBH) 21 March 1996 (1996-03-21) page 1, line 1 - line 20 page 1, line 50 - line 63 page 2, line 15 - line 67; claims; figure 1; examples 1-4,6-8	1-15, 22-30

-/--

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*&\* document member of the same patent family

Date of the actual completion of the international search

6 August 2001

Date of mailing of the international search report

20/08/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Marttin, E

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/03027

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 99 47128 A (SQUIBB BRISTOL MYERS CO)  23 September 1999 (1999-09-23)  page 1, line 14 - line 33  page 4, line 13 -page 5, line 11  page 9, line 20 -page 10, line 16  page 11, line 8 -page 12, line 10  page 13, line 17 - line 34  page 14, line 6 -page 16, line 15  page 16, line 34 -page 17, line 33  page 18, line 32 -page 20, line 15  page 28, line 16 - line 26  page 29, line 29 -page 30, last line;  claims; examples 1-3</p>	1-15, 22-30
X	<p>EP 0 526 862 A (VECTORPHARMA INT)  10 February 1993 (1993-02-10)</p> <p>page 4, line 13 - line 29  page 4, line 45 - line 53  page 5, line 1 - line 7  page 5, line 16 - line 36  page 5, line 41 - line 43  page 6, line 1 - line 53  page 7, line 20 - line 30  page 7, line 47 - line 53; claims  1,7,11-16,18-22; examples 2,5,6</p>	1-15,22, 23, 25-29, 31,33
X	<p>GB 1 428 426 A (PURDUE RESEARCH  FOUNDATION) 17 March 1976 (1976-03-17)</p> <p>page 1, line 5 - line 6  page 2, line 23 -page 5, line 18  page 6, line 58 -page 7, line 12  page 7, line 54 -page 8, line 8; claims  1,21,22,28-30,35,36; examples 1,3-5,7,9,10</p>	1-12, 22-29, 31,33
X	<p>US 5 151 273 A (KORSATKO-WABNEGG BRIGITTA  ET AL) 29 September 1992 (1992-09-29)</p> <p>column 2, line 13 - line 44; figure 3  column 2, line 55 -column 3, line 7  column 3, line 21 - line 36  column 3, line 61 -column 4, line 2;  claims; examples 4,5</p>	1,2, 6-13,22, 23,25-29
X	<p>WO 98 08515 A (JAGOTEC AG ;VERGNAULT GUY  (FR); DUFOUR ALAIN (FR); GRENIER PASCAL)  5 March 1998 (1998-03-05)  page 3, line 3 -page 5, line 34  page 7, line 26 -page 8, line 19; claims  1-3; example 1</p>	1,3-11, 13-15, 22,25-29

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

## Continuation of Box I.2

Present claims 1-12 and 22-34 relate to a composition defined by reference to two desirable characteristics or properties, namely first a solid polymeric matrix that swells upon imbibition of water to a size large enough to promote retention in the stomach while the stomach is in fed mode, and second when said dosage form is immersed in gastric fluid, said drug is released from said dosage form into said gastric fluid at a controlled rate limited at least in part by diffusion of said drug through said shell to an extent that at least about 40% of said drug remains unreleased one hour after such immersion has begun and substantially all of said drug is released within about twenty-four hours after such immersion has begun. Present claims 1-12 and 22-34 are lacking an essential feature and contain no technical feature allowing a search for these compositions. The two functional features, defining a result to be achieved, provide instructions that are insufficiently clear for the expert to reduce them to practice without undue burden. The results to be achieved cannot be directly and positively verified by tests specified in the description.

The claims cover all compositions having these characteristics or properties, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such compositions. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the compositions by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the compositions prepared in examples 1-15 and those described in claims 13-21, and the concepts of: a solid polymeric matrix that swells upon imbibition of water to a size large enough to promote retention in the stomach while the stomach is in fed mode; and when said dosage form is immersed in gastric fluid, said drug is released from said dosage form into said gastric fluid at a controlled rate limited at least in part by diffusion of said drug through said shell to an extent that at least about 40% of said drug remains unreleased one hour after such immersion has begun and substantially all of said drug is released within about twenty-four hours after such immersion has begun.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/03027

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9855107 A	10-12-1998	AU 729529 B AU 8138698 A EP 0998271 A JP 2000513028 T	01-02-2001 21-12-1998 10-05-2000 03-10-2000
DE 4432757 A	21-03-1996	AU 3567295 A WO 9608243 A EP 0781129 A IL 115309 A JP 10505604 T US 5955106 A ZA 9507670 A	29-03-1996 21-03-1996 02-07-1997 31-08-2000 02-06-1998 21-09-1999 13-03-1997
WO 9947128 A	23-09-1999	AU 3182899 A CN 1295467 T EP 1063973 A	11-10-1999 16-05-2001 03-01-2001
EP 0526862 A	10-02-1993	IT 1251153 B AT 134134 T DE 69208299 D DE 69208299 T ES 2086029 T	04-05-1995 15-02-1996 28-03-1996 18-07-1996 16-06-1996
GB 1428426 A	17-03-1976	AU 5682673 A AU 5935773 A BE 800637 A CA 1040533 A CH 582002 A DD 109309 A DD 112354 A DE 2328580 A DK 497974 A ES 415624 A FR 2187290 A HU 167947 B IE 38151 B IL 42459 A JP 49061323 A NL 7307737 A OA 4931 A RO 64146 A SE 395609 B ZA 7303897 A	12-12-1974 20-02-1975 07-12-1973 17-10-1978 30-11-1976 05-11-1974 12-04-1975 10-01-1974 26-05-1975 16-10-1976 18-01-1974 28-01-1976 04-01-1978 31-12-1976 14-06-1974 11-12-1973 31-10-1980 15-11-1978 22-08-1977 29-01-1975
US 5151273 A	29-09-1992	AT 397345 B AT 80390 A EP 0450262 A JP 6206833 A	25-03-1994 15-08-1993 09-10-1991 26-07-1994
WO 9808515 A	05-03-1998	FR 2752737 A AT 200864 T AU 724490 B AU 4020197 A BG 103138 A BR 9713237 A CN 1228700 A CZ 9900655 A DE 69704712 D	06-03-1998 15-05-2001 21-09-2000 19-03-1998 30-09-1999 04-04-2000 15-09-1999 16-06-1999 07-06-2001

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/03027

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9808515 A		EE 9900090 A	15-10-1999
		EP 0938318 A	01-09-1999
		JP 2000514462 T	31-10-2000
		NO 990944 A	27-04-1999
		NZ 334018 A	29-06-1999
		PL 331862 A	16-08-1999
		SK 27099 A	10-12-1999
		TR 9900289 T	21-12-2000
		US 6149940 A	21-11-2000